Leica L2

User manual

Leica
MICROSYSTEMS

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To you, the user

Thank you for purchasing the Leica L2 fibre-optic light source. We wish you every success with this quality product.
The Leica L2 fibre-optic light source provides excellent illumination conditions for working with a stereomicroscope in laboratory and industrial settings. The antistatic housing protects the equipment against the build-up of electrostatic charges that can have serious effects during the assembly and quality control of sensitive electronic components such as circuit boards, integrated circuits and reader heads.
The Leica L2 fibre-optic light source is a compact, powerful, competitively-priced unit which, when combined with various light guides and accessories, is suitable for a wide range of applications. By means of various adapters it can be attached to any Leica stereomicroscope, or it can be used as a free-standing lamp.

In developing this new fibre-optic light source we made simple, self-explanatory directions a priority. We have, however, put a lot of effort into explaining all functions to you by means of a combination of pictures and text. You will only get the best out of your fibre-optic light source if you take the trouble to study this user manual in detail, paying particular attention to the notes regarding the safety of electrical appliances.

If you have any questions at any time, just contact your local Leica agency or get in touch directly with Leica Microsystems (Switzerland) Ltd, CH-9435 Heerbrugg. We will be glad to help you. Customer service is a big thing with us. Not only before the sale, but afterwards as well.

Safety concept

Important notes

Before you try to use the Leica L2 fibre-optic light source and its fibre-optic light guide, please read:

- this user manual and the safety notes
- the user manual for your stereomicroscope or macroscope, including the directions for care and safety.

If safety instructions are not observed, the safety of the equipment cannot be guaranteed. The manufacturer cannot be held responsible for damage or injury caused by failure to comply with the contents of this user manual.

Permitted uses

The Leica L2 fibre-optic light source with its fibre-optic light guides is the preferred illuminator for the Leica S4 E, S6 E, S6, S6 T, S6 D and S8 APO. It can also be adapted to the Leica MS5, MZ6, MZ7$_5$, MZ9$_5$, MZ12$_5$ and MZ APO stereomicroscopes and to the Leica M420; alternatively it can be used as a free-standing light source.
The Leica L2 is designed for laboratory and industrial applications, and serves to provide powerful illumination for all types of object so that they can be observed under the stereomicroscope. With this in mind, the infrared range is filtered out and the visible component of the radiation is transmitted to the object through flexible fibre-optic light guides. The housing of the Leica L2 is made of antistatic material, providing maximum protection against electrostatic discharge. The Leica L2 is silent and free of vibrations; a 20W bulb is used, so there is no need for a fan.

Prohibited uses

The use of the Leica L2 in a manner other than that described in this user manual may result in injury, malfunction and damage.

– Do not try to carry out technical modifications.
– Do not fit different plugs or cables.
– Do not allow unauthorized persons to open or dismantle the Leica L2 or any of its components.
– Do not dismantle or modify parts unless instructions for doing so are given in the user manual.

Place of use

The Leica L2 fibre-optic light source is intended for use in closed dry rooms and may not be used outdoors.

• This instrument is not suitable for use in environments where there is a risk of explosions.

Repairs, servicing

The Leica L2 fibre-optic light source requires no maintenance. In case of repair, please note that:

– Repairs may be carried out only by the manufacturer or by the manufacturer's appointed customer service centres.
– Only original spare parts may be used.
– Before opening the Leica L2 fibre-optic light source or its power supply unit, disconnect the power supply cable. If you touch the live interior of the equipment, you may receive an electric shock.

Responsibilities of person in charge of instrument

- Ensure that the Leica L2 fibre-optic light source is operated, maintained and repaired only by authorized and trained personnel.
- Ensure that personnel who use the instrument have read and understood this manual and the manuals for the stereomicroscope/macroscope and in particular all safety instruments, and that they implement this information.
- Ensure that such personnel always have quick access to this user manual.

Legal requirements

Adhere to general and local accident prevention and environmental protection regulations.

Conformity with standards

The Leica L2 fibre-optic light source utilizes state-of-the-art technologies and has a statement of conformity with EC requirements.
For conformity with other standards, please refer to page 29.

Safety precautions during use

Liquids

Be careful when handling liquids. If spilt on the equipment, they can:

- cause the light source to become electrically live, endangering personnel
- cause damage to the equipment.

Power supply unit

- The Leica L2 fibre-optic light source is to be operated only in conjunction with the original power supply unit.
- The power supply unit is to be operated only at the stipulated mains voltages of 100 to 240V (50/60Hz).
- Always connect the power supply unit to the lamp before you connect it to the mains supply (see page 16).
- To ensure that the equipment is completely disconnected from the mains, unplug the power supply unit.

Power cables

Inspect cables regularly for damage. Defective cables can:

- directly endanger personnel
- cause the instrument and other equipment to become electrically live, endangering personnel.

Positioning cables

Position cables with care. Make sure that personnel do not get entangled with them. The instrument could fall over, fall down, become damaged, damage other equipment, or cause personal injury.

Setting up the Leica L2 fibre-optic light source

The Leica L2 fibre-optic light source:

– must always be locked into an adapter when it is in use (see page 14). This ensures its stability.
– must only be used in a vertical position with the light-guide connector at the top (see page 14).
– must be set up so that all ventilation holes are free (see page 14).

Changing the bulb

– Unplug the power cable from the mains socket.
– Never touch the inside of the lamp housing when the power supply is connected.
– Wait for the halogen bulb to cool before you try to change it. If you touch a hot bulb, you may suffer burns. There is a warning symbol inside the door of the lamp compartment as a reminder (see page 21).

While the lamp is switched on:

- Never place anything over the open connection to the light guide. The material covering the connection could be damaged by heat.
- Never use any part of your body to cover the open connection to the light guide; you could suffer burns.
- Make sure that the connections to the light guides are at least several centimetres away from any materials or objects which are sensitive to heat. The amount of heat radiation emitted from the light-guide outlet of a fibre-optic light source is negligible, but it is possible for objects to convert the intense visible radiation into heat and to become damaged.

  Minimize the time during which the object is illuminated, and also the light intensity.
- When detaching the light guide, avoid touching the hot inlet of the light guide. Switch off the light source and wait until the light guide has cooled down.

  Immediately above the light guide inlet is shrink-on tubing that enables the hot light guide to be touched without danger.
- Do not look directly into the open connector of the light guide; you could be temporarily dazzled. First switch off the bulb before you pull out the light guide.

Symbols used

Warning: Electrical current
This symbol denotes information that must be read and obeyed.

Disregarding these instructions can cause injury.

Safety instruction
This symbol denotes information that must be read and obeyed.

Disregarding these instructions can cause a malfunction in, or damage to, the instrument.

Hot surface warning.
Disregarding this information can result in burns.

Important information
This symbol denotes additional information or explanations that have been provided for understanding.

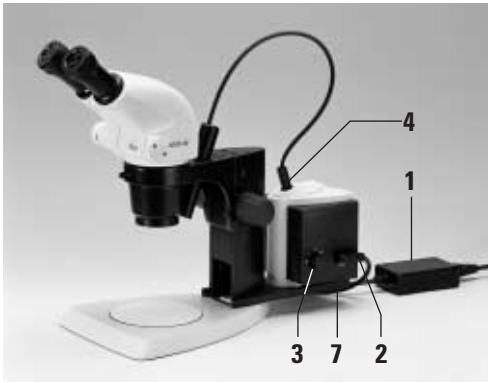
Action
▶ This symbol indicates that certain operations must be carried out.

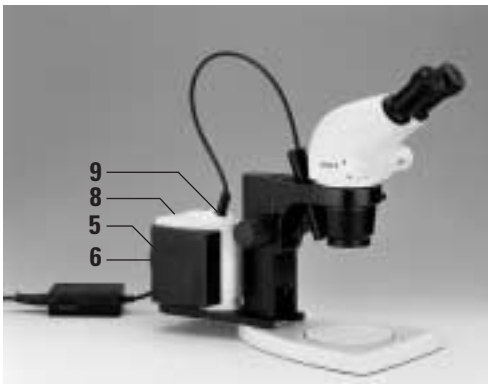
Explanatory notes
• This symbol indicates additional information and explanations.

Overview

Overview of equipment

1 Power supply unit with connecting cable and power plug
2 Connection socket for power supply unit
3 On/Off switch with brightness control
4 Connector for light guide
5 Lamp compartment with socket for 8V/20W halogen reflector bulb
6 Handle for opening the lamp compartment
7 Adapter mounting rail
8 Ventilation holes
9 Ventilation holes
10 Ventilation hole (on base of unit)
11 Type plate (on base of unit)

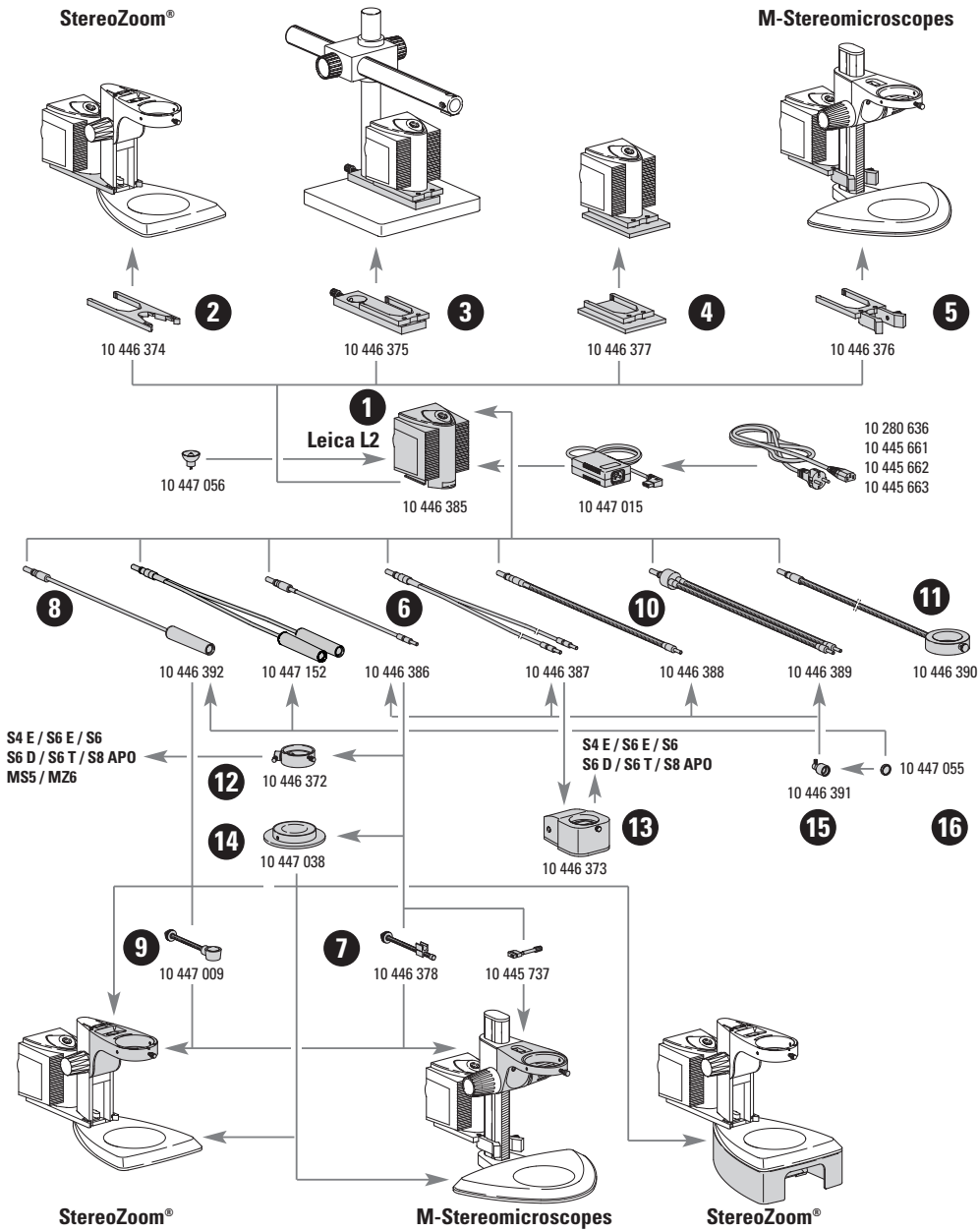




Installation

Overview

1 Leica L2 fibre-optic light source
2 Adapter for focus column
3 Adapter for swinging-arm stand and for cylindrical columns
4 Baseplate for stand-alone operation
5 Adapter for 300mm focus drive
6 Flexible fibre-optic light guide with one or two arms
7 Flexible light guide mount
8 Universal light guide, one or two arms
9 Universal light guide mount
10 Gooseneck light guide with one or two arms
11 6-point ring light
12 Near-vertical illuminator
13 Coaxial illuminator
14 Transmitted-light stage
15 Focusing lens
16 Filter for focusing lens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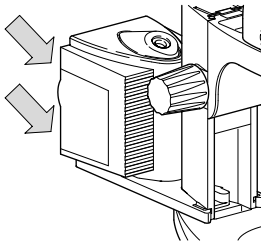
StereoZoom®

Installation

Adapters for stereomicroscopes and for stand-alone operation.
Four adapters are available for connecting the Leica L2 fibre-optic light source to various stereomicroscope stands and for stand-alone operation.

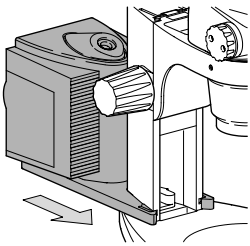
When in use, the Leica L2 fibre-optic light source must always be locked into an adapter to ensure stability (page 8).

To remove the light source from the adapter, press the two spring flaps at the back of the light-source housing together and pull the light source out of the bracket. Handling the spring flaps improperly can cause them to break off.

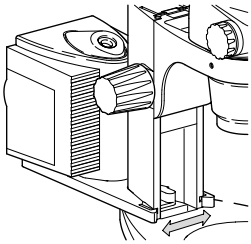


Adapter for StereoZoom focus column

- ▶ Using the short fork, clamp the adapter to the focus column.
- ▶ Using the mounting rail, slide the fibre-optic light source into the long adapter fork until it engages.

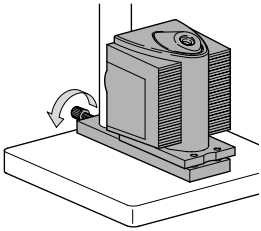


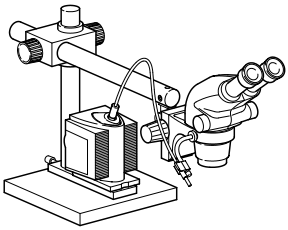
To remove the adapter from the focusing column, first remove the light source as described above. Then press the two fork ends of the adapter apart a little, until it is easy to pull out.



Adapter ➔ for swinging-arm stands and cylindrical columns

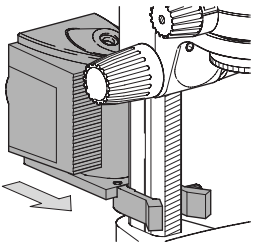
- ▶ Using the mounting rail, slide the fibre-optic light source into the adapter fork until it engages.
- ▶ Secure the adapter to the vertical column by tightening the screw.





Adapter ➔ for 300mm focusing drive M-stereo-microscopes

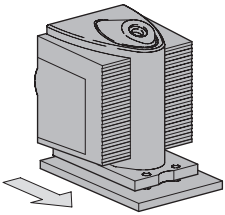
- ▶ Secure the clamp to the 300mm focusing drive by tightening the screw.
- ▶ Using the mounting rail, slide the fibre-optic light source into the adapter fork until it engages.



Adapter ➔ baseplate

When mounted on the baseplate, the light source can be used as a stand-alone unit.

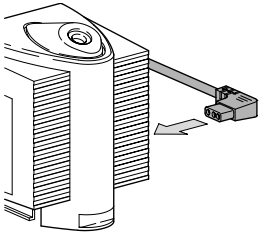
- ▶ Using the mounting rail, slide the fibre-optic light source into the adapter fork until it engages.



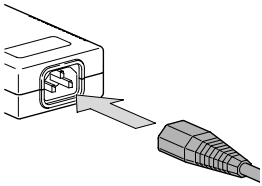
Power supply unit ➔ light source

Use only the original power supply unit with the specified mains voltages of 100 to 240V (50/60Hz).

- ▶ Make sure that the light source is switched off (see page 20).
- ▶ First connect the power supply unit to the input socket of the light source.



- ▶ Connect the mains lead to the power supply unit and connect the power supply unit to the mains.

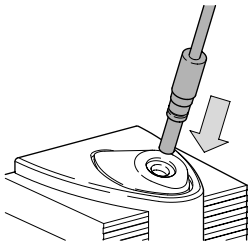


Light guide ➔ light source

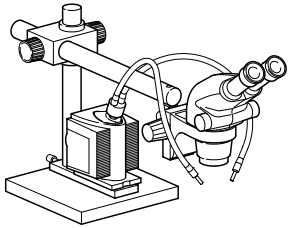
Depending on the application required, various types of light guide and arms are available for fitting to the stereomicroscope (see below). Perfect functioning, safety, maximum use of the light available, and uniform illumination, are assured only if the original light guides are used.

If the light guide has a guide pin, make sure that it connects with one of the corresponding slits.

- ▶ Push the light guide into the holder so that it engages.



Gooseneck light guides that require no support can now be positioned relative to the object.
Other types of light guide are attached to the stereomicroscope as described below.



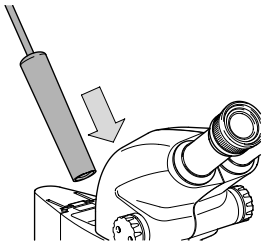
Light guide ➔ stereomicroscope

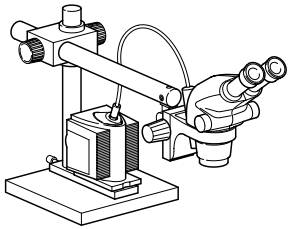
Please note that the universal light guide on the Leica S8 APO can only be used with the sideways-mounted lamp arms.

One and two arm Universal light guide

On the Leica S4 E, S6 E, S6, S6 T and S6 D the one-arm universal light guide can be inserted directly in the microscope bracket:

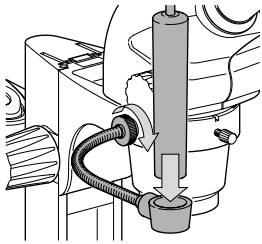
- Insert the outlet of the light guide into the port on the microscope carrier.

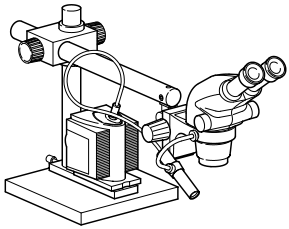




Universal light guide assembly with lamp arms

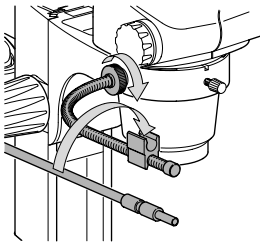
- One or two arms for the universal light guide mount into the thread to the left or right of the microscope carrier.
- Fit the outlet of the light guide into the holder.

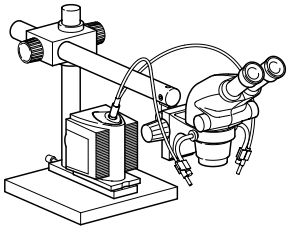




One- and two-branched flexible light guides

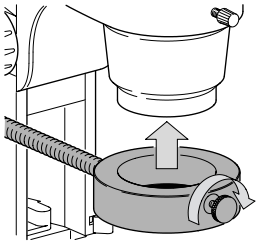
- Screw one or two arms for flexible light guides into the thread to the left or right of the microscope carrier or into the one beneath it.
- Fit the outlet of the light guide into the holder.
- If required, use the clamping screw to secure the focusing lens to the outlet of the light guide (see page 22).

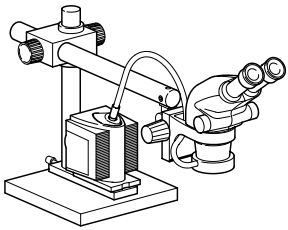




6-point ring light

- Use the clamping screw to secure the 6-point ring light to the objective of the stereomicroscope.
- If necessary, thread the pipe through the port on the microscope carrier.





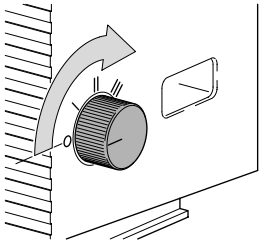
Starting up

Before you try to use the light source, please read the safety notes on page 7.

The power supply unit for the Leica L2 fibre-optic light source is voltage-sensitive, i.e. it automatically sets itself to the voltage available (100 to 240V) and ensures a constant illumination level, independent of voltage fluctuations.

Switching on and off, adjusting the brightness

The light source is switched on and off with the brightness-adjustment control.
Position 0: The instrument is switched off.



To ensure that the equipment is completely disconnected from the power supply, detach the plug of the power supply unit.

Positions I and II: The instrument is operating at below nominal voltage, greatly extending the life of the halogen bulb:

– Lamp service life at level I approx. 5000 hours.
– Lamp service life at level II approx. 1000 hours.

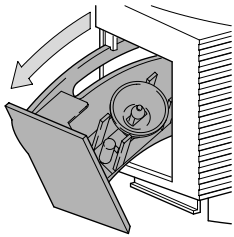
Position III: Maximum light output.
The instrument is operating at nominal voltage.
The colour temperature is about 3200 K, and the average bulb life about 250 hours.

Changing the bulb

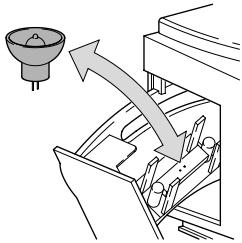
The light source is designed for use with Osram type 64255 8V/20W bulbs. Other types of bulb will supply the light guides with considerably less illumination.
Wait for the halogen bulb to cool before you try to change it (see page 8). To remind you, there is a warning symbol inside the door of the lamp compartment.

▶ Open the lamp compartment by gently pulling the handle.

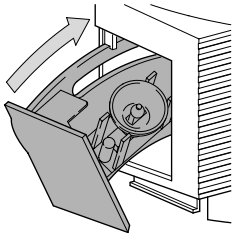
• If the bulb is still on, it will now extinguish automatically.



▶ Remove the old 8V/20W bulb and inset a new one.



▶ Close the lamp compartment. The door of the compartment clicks into place.



Accessories

Perfect functioning, safety and maximum light quality are assured only if the original accessories are used with the Leica L2 fibre-optic light source.

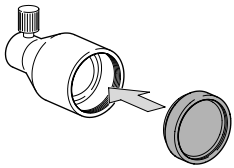
The various adapters available for the light source and for the light guides are described on pages 14–17.

Focusing lens and filter

These can be used with the flexible light guides and the gooseneck light guides.

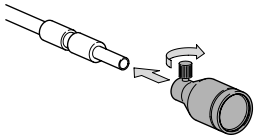
- The focusing lens reduces the illumination aperture to about 20° (full angle) while simultaneously increasing the light intensity of the spot by a factor of around three.

A daylight filter is available for the focusing lens and with the universal light guide.



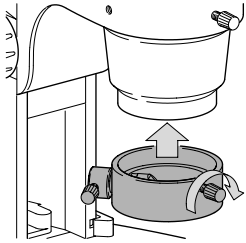
▶ Screw the filter into the focusing lens.

▶ Use the clamping screw to secure the focusing lens to the outlet of the light guide.



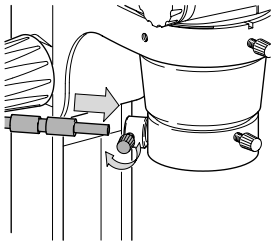
Near-vertical illuminator

The near-vertical light beam penetrates depressions and cavities, suppressing the distracting shadows caused by the presence of microtools.

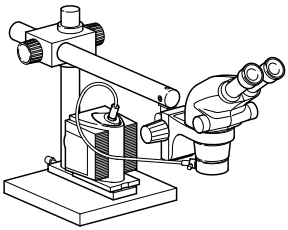


▶ Secure the lamp housing to the objective mount of the stereomicroscope using the clamping screw.

- The clamping screw should be at the front and the light guide connector at the rear left.



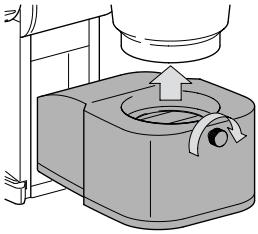
▶ Connect the flexible light guide to the light source (see page 18) and to the lamp housing.



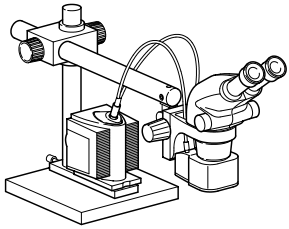
Coaxial illuminator

Flat, highly-reflective surfaces, such as those of wafers, integrated circuits and polished metal sections, can be seen well in coaxial incident light by virtue of the differing interference colours. In this illumination technique, the light beams are mirrored along the observation beam paths of the stereomicroscope.

▶ Secure the lamp housing to the objective mount of the stereomicroscope using the clamping screw.

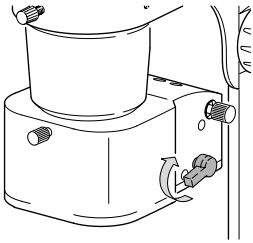


▶ Connect the flexible two-armed light guide to the source (see page 18) and connect it to the lamp housing.



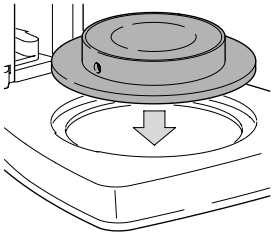
▶ Closing left and right clamping screws.

The lever on the right-hand side is used to swing a neutral absorber in and out. With the neutral absorber you can reduce the brightness without changing the color temperature.

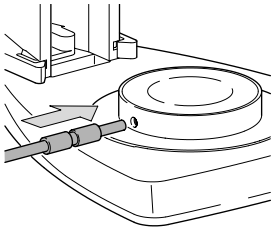


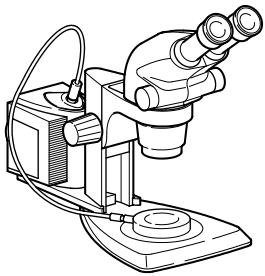
Transmitted-light stage

▶ Insert the transmitted-light stage into the 120mm-diameter port.



▶ Connect the flexible light guide to the light source (see page 18) and to the transmitted-light stage.





Notes

Troubleshooting

Problem	Possible cause	Remedy
No light	Instrument not switched on	Switch on the instrument
	Halogen bulb defective	Fit a new bulb
	Lamp compartment not closed	Close the lamp compartment
	No power	▶ Inspect all connections: ▶ Is the power supply unit connected to the socket of the light source? ▶ Is the mains lead plugged in? ▶ Check the available voltage

If, none of the above remedies eliminates the fault, please contact your nearest Leica agency. Solutions other than those above must be implemented by authorized technicians from Customer Service (see page 5).

Technical data

General information	Values	Conforming to
Model code	Leica L2	
Dimensions (breadth × depth × height)	approx. 125 × 110 × 150mm	
Weight	approx. 0.53kg	
Cooling	Convection	
Ambient temperature	+ 5°C to + 40°C	EN 61010-1
Relative humidity	– ambient temperature up to 31°C: 85% – ambient temperature from 31°C to 40°C: linear decrease to 75%	EN 61010-1
Atmospheric pressure	700 to1060 hPa	
Degree of contamination	2	EN 61010-1

Notes

Electrical data		
Operating voltage of voltage-sensitive power supply unit	Approx. 100 to 240V, 50 / 60Hz	
Maximum power consumption	20W	
Bulb	Halogen reflector bulb, 8V/20W	
Average bulb life	– at level I approx. 5000 h. – at level II approx. 1000 h. – at level III approx. 250 h.	
Technical data (light) Maximum usable bundle diameter of light guide	6mm	
Total light flux at outlet of light guide, step III – light guide diam. 4.5mm, typical values – light guide dia. 6.0mm, typical values	54lm 63lm	
Colour temperature	3200K	
Incidence angle of light beam (2aeff)	approx. 55°	DIN 58 141-10
Measures to reduce IR radiation	Cold-light reflector	

Compliance with standards	– Safety requirements for electrical equipment for measurement, control and laboratory use	DIN EN 61010-1:1993 IEC 1010-1
	– Electrical equipment for laboratory use	UL 3101-1
	– Low voltage directive	73/23/EEC
	– EMC directive	89/336/EEC
	– With CE certificate of conformity	

Technical data are not binding and are subject to change in the course of technological development.

Spare parts

	Article number
Halogen reflector bulb 8V/20W	10 447 056

Notes

We guarantee quality

You are working with a high-precision, high-performance instrument, from which you have high expectations.

We therefore guarantee the quality of each of our instruments. Our guarantee covers all material and manufacturing defects. It does not, however, cover damage resulting from careless or improper handling.

Please handle your valuable optical instrument with respect. It will then fulfil its function with the same precision for decades and live up to the reputation which our instruments enjoy!
If, contrary to expectations, your stereomicroscope develops a fault, please call in a specialist – contact your local Leica agent or the factory in Heerbrugg, Switzerland.

Protect your instruments:

- from damp, vapours, acids, alkalis and corrosive substances.
  Keep chemicals away from the instruments.
- from misuse.
  Do not use non-standard plugs. Never dismantle optical systems or mechanical parts unless instructions for doing so are given in the user manual.
- from oil and grease.
  Do not grease guide surfaces and mechanical parts.

Care

Dust and dirt will affect the quality of your results

- Put a dust cover over the instrument during pauses in work.
- Remove dust with a rubber blower or soft brush.
- Clean objectives and eyepieces with special optic cleaning cloths and pure alcohol.
- Protect accessories against dust when not in use.

Cleaning polymer components

The use of unsuitable cleaning agents and techniques can damage polymers, so always observe the following rules:

Do nots

- Never clean polymers in an ultrasonic bath. They can become brittle and later break.
- Never use corrosive cleaning agents or agents containing acetone, e.g. ether substitute.
- Never use solvents (except for ethanol or isopropanol).

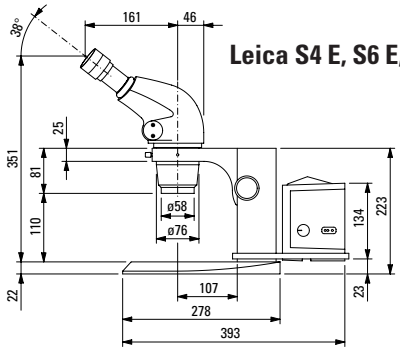
Safe cleaning techniques

- Wipe down the outside of the instrument with a soft dry cloth or with off-the-shelf cleaning cloths for polymers.
- The best method is generally to use warm soapy water and rinse afterwards with distilled water because the soapy water does not attack the polymer and is environmentally acceptable.
- Clean with industrial alcohol or isopropanol, taking appropriate safety precautions.

Always take appropriate safety precautions when using industrial alcohol and isopropanol.

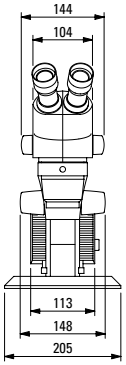
Dimensions of Leica L2 with Leica S4 E, S6 E, S6 T

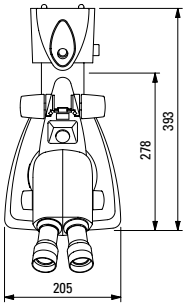
with incident-light stand



Leica S4 E, S6 E, S6 T

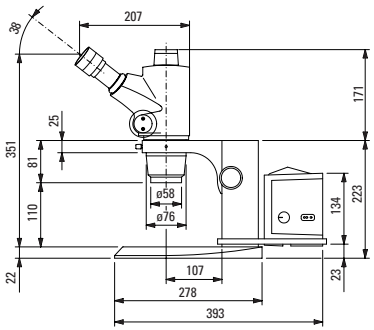
Dimensions in mm





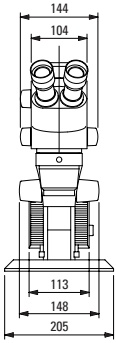
Dimensions of Leica L2 with Leica S6 D

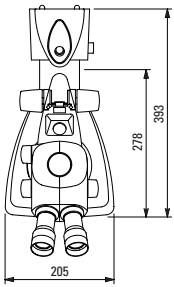
with incident light stand



Leica S6 D

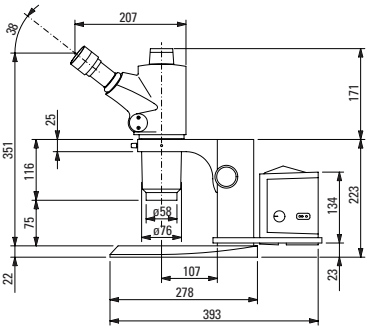
Dimensions in mm





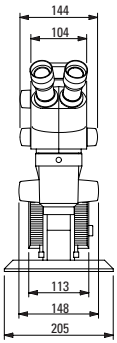
Dimensions of Leica L2 with Leica S8 APO

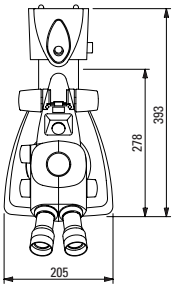
with incident-light stand



Leica S8 APO

Dimensions in mm





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Leica Microsystems' Mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement, lithography and analysis of microstructures.

Leica, the leading brand for microscopes and scientific instruments, has developed from five brand names, all with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Leica symbolizes not only tradition, but also innovation.

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Our automated, leading-edge measurement and inspection systems and our E-beam lithography systems make us the first choice supplier for semiconductor manufacturers all over the world.

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